

Tactical Combat Casualty Care

August 2011





Pre-Test





What is TCCC and Why Do I Need to Learn about it??



- **Coalition forces presently have the best casualty treatment and evacuation system in history.**
- **TCCC is what will keep you alive long enough to benefit from it.**



Comparison of Statistics for Battle Casualties, 1941-2005

Holcomb et al J Trauma 2006

The U.S. casualty survival rate in Iraq and Afghanistan has been the best in U.S. history.

	World War II	Vietnam	OIF/OEF
CFR	19.1%	15.8%	9.4%

Note: CFR is the Case Fatality Rate – the percent of those wounded who die



Why Are We Doing Better?

- Improved Personal Protective Equipment
- **Tactical Combat Casualty Care**
- Faster evacuation time
- Better trained medics

Holcomb et al J Trauma 2006



TCCC: The New Standard of Care for Managing Trauma on the Battlefield

- **Used by Army, Navy, Air Force, Marine Corps, Coast Guard**
- **Used by most coalition partner nations**
- **Used by NATO**
- **Used by other countries around the world**



Objectives

- **EXPLAIN** the differences between military and civilian pre-hospital trauma care
- **DESCRIBE** the key factors influencing combat casualty care
- **UNDERSTAND** how TCCC developed
- **DESCRIBE** the phases of care in TCCC



Importance of the First Responder

- **75-90% of all combat deaths occur before the casualty reaches a Medical Treatment Facility (MTF)**
- The fate of the injured often lies in the hands of the one who provides the first care to the casualty.
- Corpsman, medic, or pararescueman (PJ)
- Combat Lifesaver or non-medical combatant



Trauma Care Setting



Tactical Trauma Care Setting - Shrapnel Wound in the Hindu Kus





Prehospital Trauma Care: Military vs. Civilian

- **Hostile fire**
- **Darkness**
- **Environmental extremes**
- **Different wounding epidemiology**
- **Limited equipment**
- **Need for tactical maneuver**
- **Long delays to hospital care**
- **Different medic training and experience**





Prior Medical Training

- Combat medical training historically was modeled on civilian courses
 - EMT, PHTLS
 - BTLS, ATLS
- Trained to standard of care in non-tactical (civilian) settings
- Tactical elements not considered



Different Trauma Requires Different Care Strategies

- It is intuitive that combat and civilian trauma are different, BUT...
- It is difficult to devise and implement needed changes.
- No one group of medical professionals has all of the necessary skills and experience.
- Trauma docs and combat medical personnel have different skill sets. Both are needed to optimize battlefield trauma care strategies.
- Tourniquets are one striking example of how battlefield trauma care has sometimes been slow to change.



Tourniquets in WWII

Wolff AMEDD J April

1945

“We believe that the strap-and-buckle tourniquet in common use is ineffective in most instances under field conditions...it rarely controls bleeding no matter how tightly applied.”



Vietnam

Over 2500 deaths occurred in Vietnam secondary to hemorrhage from extremity wounds. These casualties had no other injuries.





Tourniquets in U.S. Military

Mid-1990s

- Old strap-and-buckle tourniquets were still being issued.
- Medics and corpsmen were being trained in courses where they were taught **not** to use them.



SOF Deaths in the GWOT

Holcomb, et al

Annals of Surgery 2007

Factors That Might Have Changed Outcomes (82 Fatalities - 12 Potentially Survivable)

- Hemostatic dressings/direct pressure (2)
- **Tourniquets (3)**
- Faster CASEVAC or IV hemostatic agents (7)
- Surgical airway vs. intubation (1)
- Needle thoracostomy (1)
- PRBCs on helos (2)
- Battlefield antibiotics





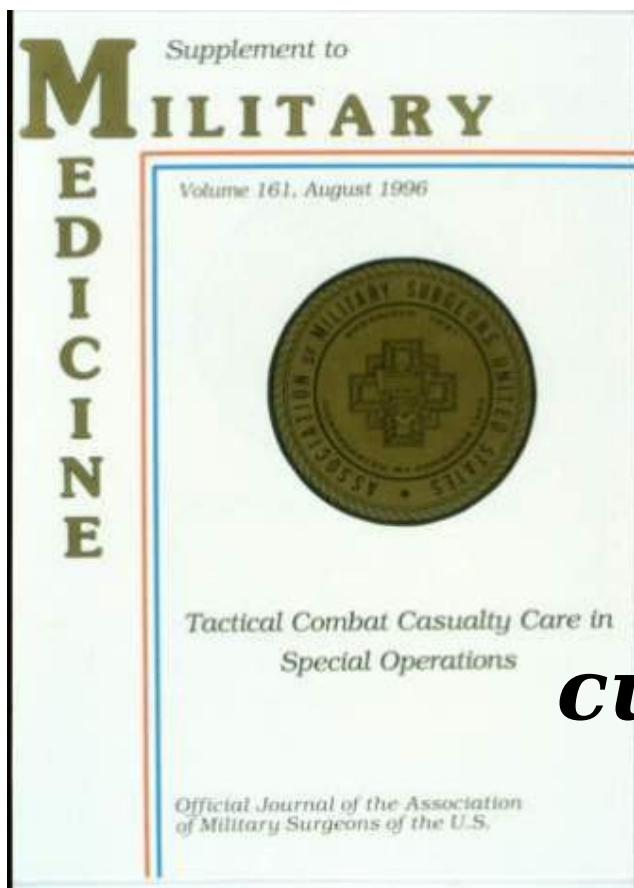
Tourniquets - Beekley et al Journal of Trauma 2008

- 31st CSH in 2004
- 165 casualties with severe extremity trauma
- 67 with prehospital tourniquets; 98 without
- Seven deaths
- **Four of the seven deaths were potentially preventable had adequate prehospital tourniquets been placed**





Tactical Combat Casualty Care in Special Operations



Military Medicine Supplement August 1996

*Trauma care guidelines
customized for the battlefield*



TCCC

- Originally a Special Operations research effort
- Trauma management plans that take into account the unique challenges faced by combat medical personnel
- Now used throughout U.S. military and by most allied countries
- **TCCC has helped U.S. combat forces to achieve the highest casualty survival rate in history.**



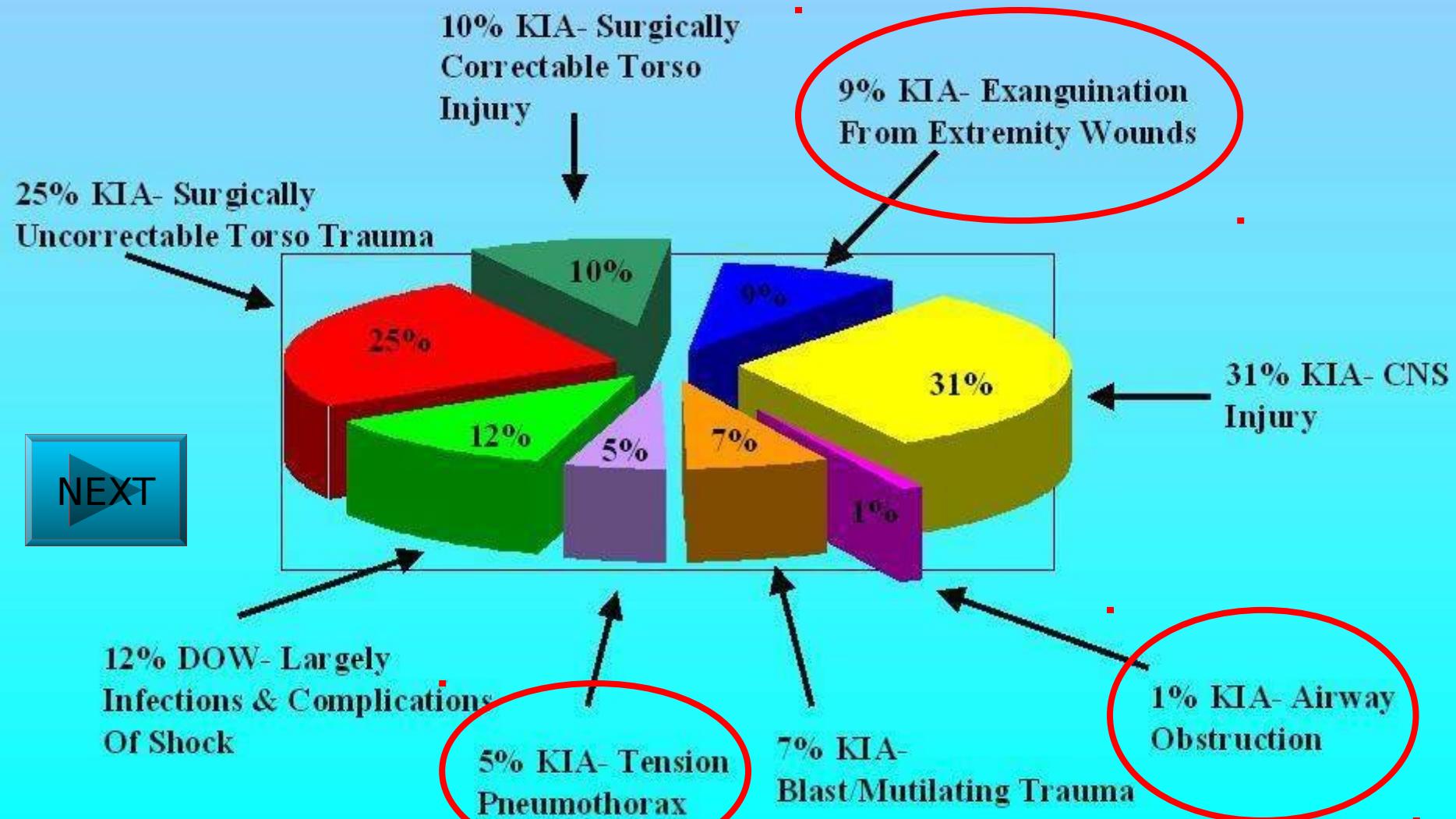
TCCC Approach

- Identify the causes of preventable death on the battlefield
- Address them aggressively
- **Combine good medicine with good tactics**



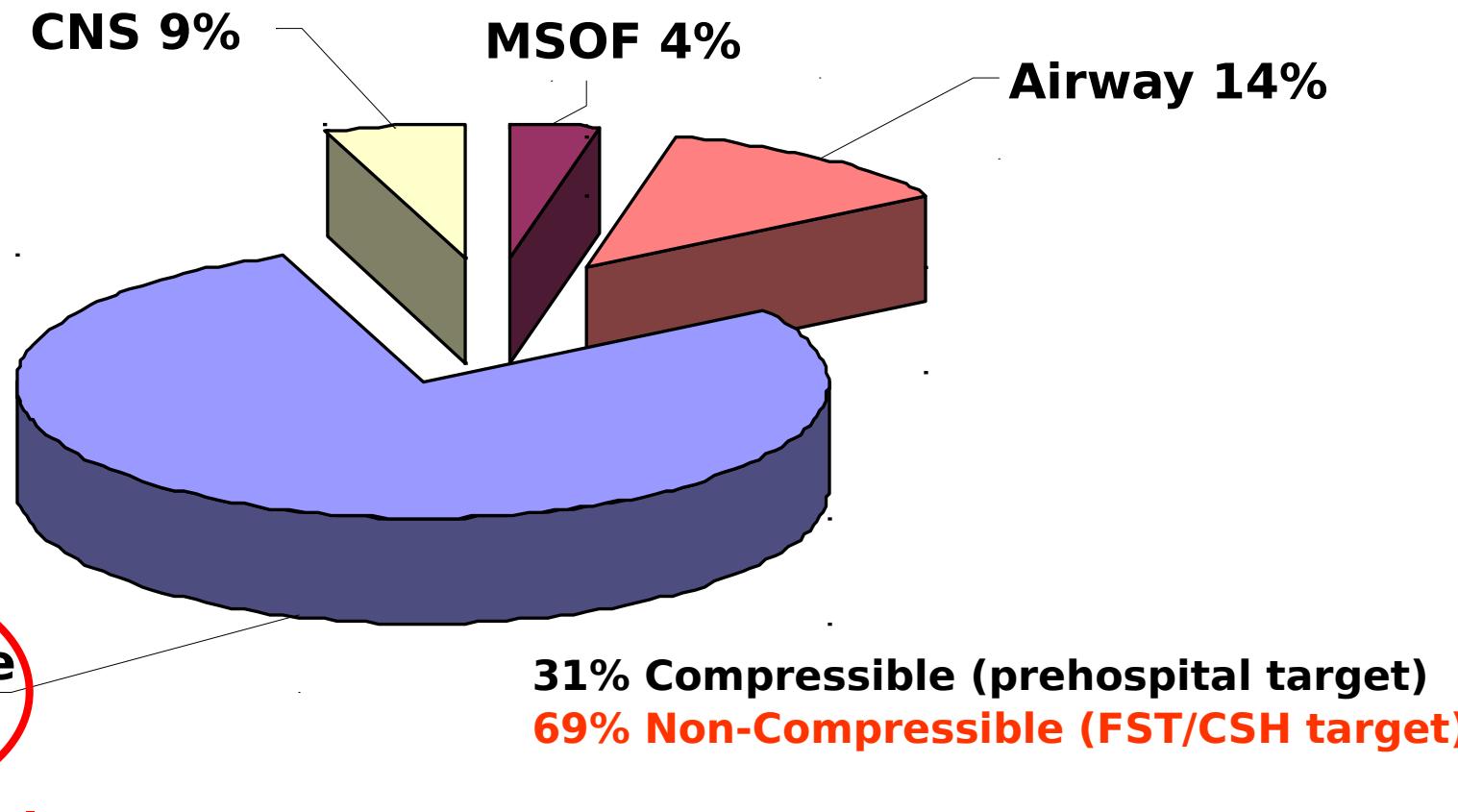
How People Die In Ground Combat (From COL Ron Bellamy)

Data based on the Wound Data Munitions Effectiveness Team (WDMET) during the Vietnam War between 1967 and 1971





Potentially Preventable Deaths (232) in OIF and OEF



From evaluation of 982 casualties, and casualties could have more than 1 cause of death. (Kelly J., J Trauma 64:S21, 2008)



Point of Wounding Care

Causes of preventable death on the battlefield today:

- **Hemorrhage from extremity wounds**
- **Junctional hemorrhage (where an arm or leg joins the torso, such as in the groin area after a high traumatic amputation)**
- **Non-compressible hemorrhage (such as a gunshot wound to the abdomen)**
- **Tension pneumothorax**
- **Airway problems**



Junctional Hemorrhage



These types of wounds are often caused by IEDs and may result in junctional hemorrhage.



Extremity Hemorrhage

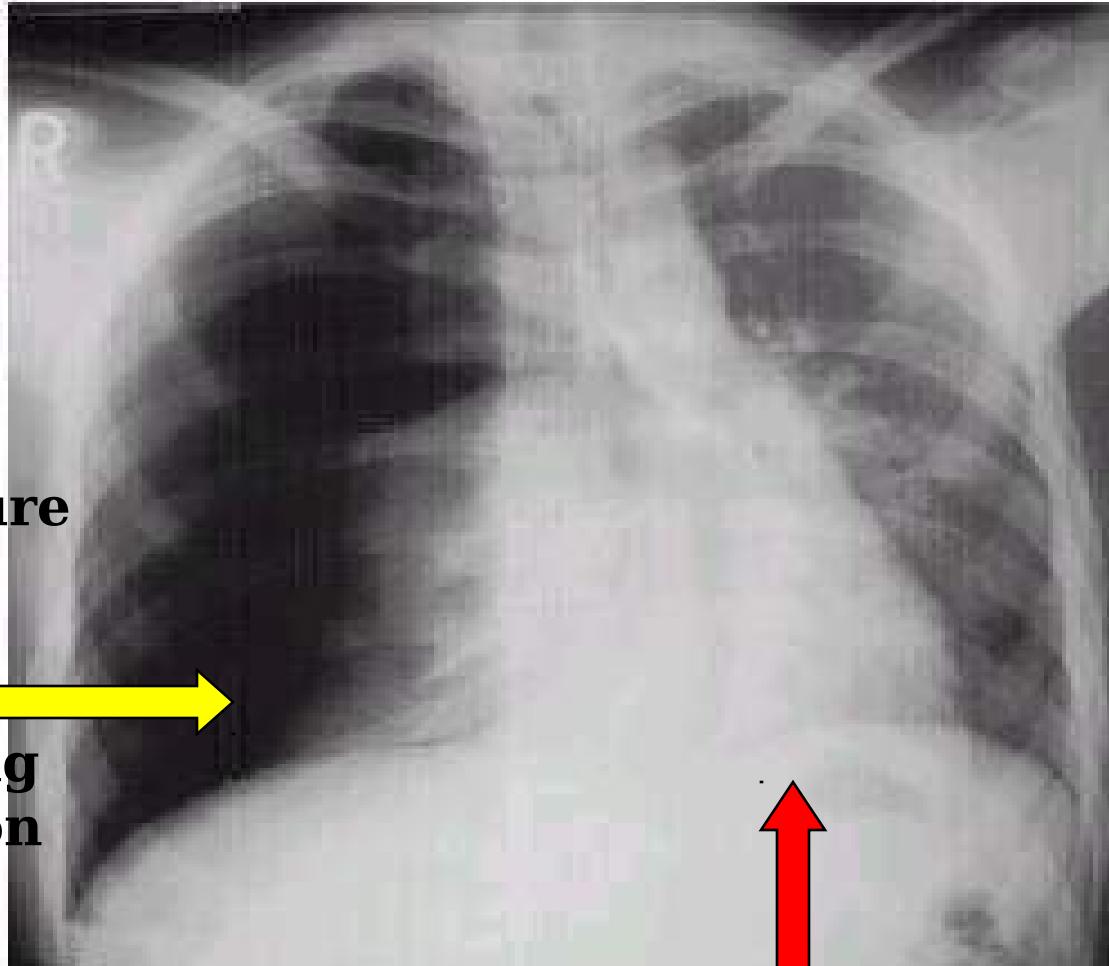


Click on picture to start video



Tension Pneumothorax

Air escapes from injured lung - pressure builds up in chest
Air pressure **collapses lung** and pushes on heart



Heart compressed - not able to pump well



Airway Trauma





Three Objectives of TCCC

- Treat the casualty
- Prevent additional casualties
- Complete the mission





TCCC Guidelines 1996

- **Tourniquets**
- **Aggressive needle thoracostomy**
- **Nasopharyngeal airways**
- **Surgical airways for maxillofacial trauma**
- **Tactically appropriate fluid resuscitation**
- **Battlefield antibiotics**
- **Improved battlefield analgesia**
- **Combine good tactics and good medicine**
- **Scenario-based training**
- **Combat medic input to guidelines**



Changes in TCCC: How Are They Made?



The Committee on Tactical
Combat Casualty Care



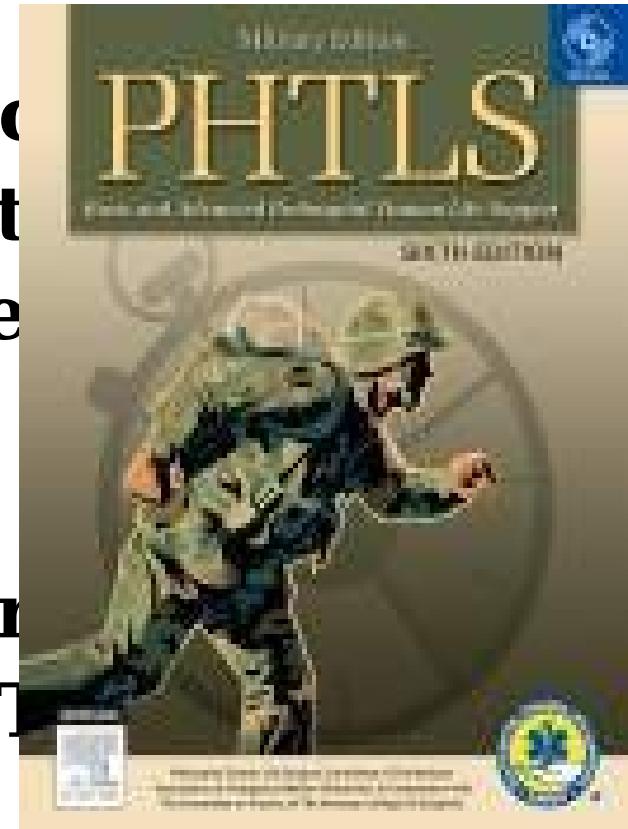
Committee on Tactical Combat Casualty Care

- Sponsored by the DoD
- 42 members from all services in the DoD and civilian sector
- Trauma Surgeons, ER and Critical Care physicians, operational physicians; medical educators; combat medics, corpsmen, and PJs
- **Nearly 100% deployed experience**
- Meet quarterly; update TCCC as needed
- **Part of Defense Health Board - senior medical advisory body to SECDEF**



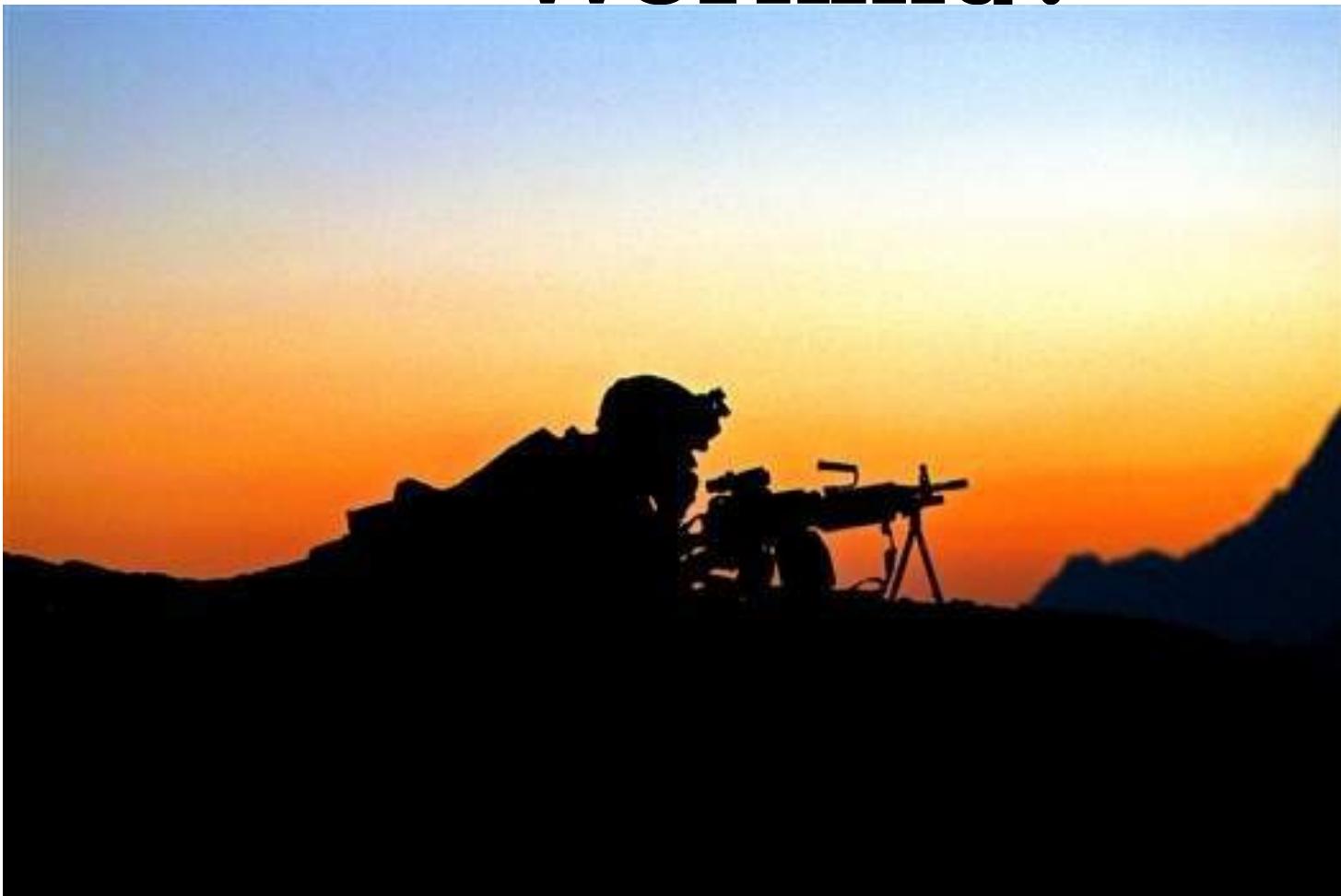
TCCC Now

- **Combat Gauze**
- **Intraosseous infusion device**
- **Combat Pill Pack - antibiotic and non-narcotic pain medications**
- **Hypotensive resuscitation with Hextend**
- **Fentanyl lozenges for severe pain**
- **Combat Ready Clamp and Tourniquet**
- **Hypothermia prevention**
- **Management of wounded hostile combatants**





TCCC: How Do We Know That it's Working?





TCCC

“I am writing to offer my congratulations for the recent dramatic advances in prehospital trauma care delivered by the U.S. military. Multiple recent publications have shown that Tactical Combat Casualty Care is saving lives on the battlefield.”

*Dr. Jeff Salomone
American College of Surgeons Committee on Trauma
Chairman of Prehospital Trauma Subcommittee
Letter to ASD Health Affairs
10 June 2008*



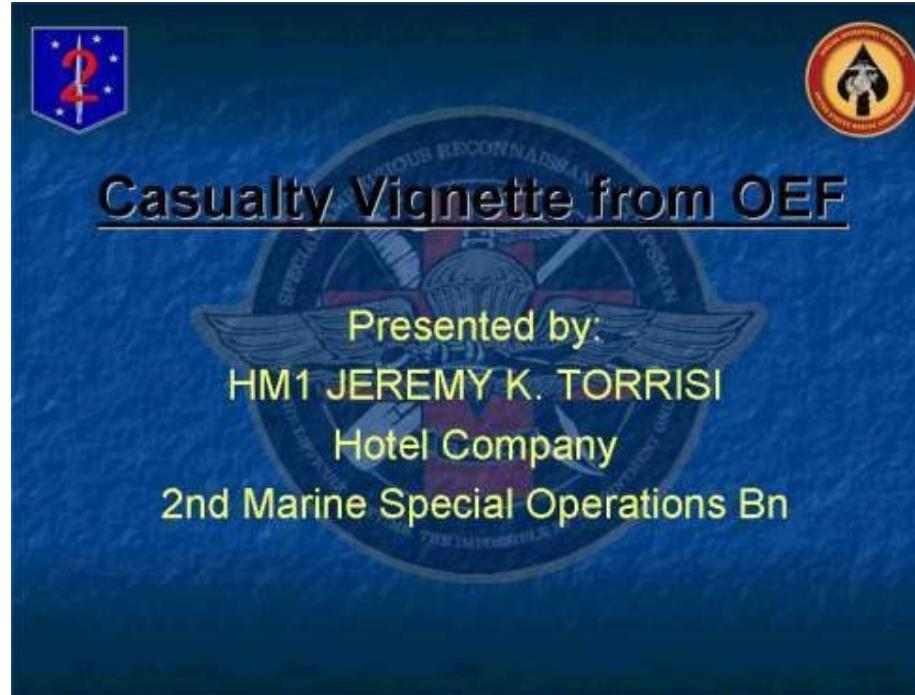
Mabry and McManus AMEDD Center and School

“The new concept of Tactical Combat Casualty Care has revolutionized the management of combat casualties in the prehospital tactical setting.”

Critical Care Medicine
July 2008



USMC Casualty Scenario 2008



- **CoTCCC gets input directly from combat corpsmen, and USAF pararescuemen (PJs)**
- **15 casualties - 4 tourniquets applied**
- **3 lives saved - 4th casualty died from che**



Tourniquets - Kragh et al: Two Landmark Papers



- Published in 2008/2009
- Tourniquets are saving lives on the battlefield
 - 31 lives saved in 6 months by tourniquets
 - Author estimates 2000 lives saved with tourniquets



What Do the Soldiers Say?

A recent U.S. Army Training and Doctrine Command survey of Soldiers in combat units found that **TCCC is the second most valued element** of their training, exceeded only by training in the use of their individual weapon.



***COL Karen O'Brien
TRADOC***

CoTCCC Meeting



Preventable Death on the Field



- TCCC in the 75th Ranger Regiment
- All Rangers and docs trained in TCCC
- Ranger preventable death incidence: **3%**



Phases of Care in TCCC: Timing Is Everything

- Casualty scenarios in combat usually entail both a medical problem as well as a tactical problem.
- We want the best possible outcome for both the casualty and the mission.
- Good medicine can sometimes be bad tactics; bad tactics can get everyone killed or cause the mission to fail.
- **Doing the RIGHT THING at the RIGHT TIME is critical**



TCCC Phases of Care

- TCCC divides care into 3 phases based on the tactical situation.
- During the gunfight, attention is focused primarily on eliminating the threat.
- As the threat decreases, increasing focus is applied to providing the best possible medical care for the casualties.



Phases of Care in TCCC

- Care Under Fire
- Tactical Field Care
- Tactical Evacuation Care





Care Under Fire

Care under fire is the care rendered by the first responder or combatant at the scene of the injury while he and the casualty are still **under effective hostile fire**. Available medical equipment is limited to that carried by the individual or by the medical provider in his or her aid bag.



Tactical Field Care

Tactical Field Care is the care rendered by the first responder or combatant once he and the casualty are **no longer under effective hostile fire**. It also applies to situations in which an injury has occurred, but there has been no hostile fire.

Available medical equipment is still limited to that carried into the field by unit personnel. Time to evacuation to a medical treatment facility may vary considerably.



Tactical Evacuation Care

Tactical Evacuation Care is the care rendered once the casualty has been picked up by an aircraft, vehicle or boat. Additional medical personnel and equipment that may have been pre-staged should be available in this phase of casualty management.



Summary of Key Points

- Prehospital trauma care in tactical settings is markedly different from civilian settings.
- Tactical and environmental factors have a profound impact on trauma care rendered on the battlefield.
- Good medicine can be bad tactics.
- Up to 24% of combat deaths today are potentially preventable.
- Good first responder care is critical.
- **TCCC will give you the tools you need!**



Summary of Key Points

- **Three phases of care in TCCC**
 - **Care Under Fire**
 - **Tactical Field Care**
 - **TACEVAC Care**



Summary of Key Points

- **TCCC - designed for combat**
- **NOT designed for civilian trauma settings**



Questions?

